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WITH SUGGESTIONS
FOR CONTROL



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THE SORGHUM MIDGE

With Suggestions for Control

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THE SORGHUM MIDGE¹ is one of the most important insects attacking grain sorghums in the Southern States. Every year its damage to this crop amounts to several million dollars. Besides damaging the grain sorghums, this pest causes great losses in the seed crops of the sweet sorghums, Sudangrass, and broomcorns. In many sections where the sorghum midge is especially abundant, as much as one-fifth of the crop may be lost, and in years particularly favorable to the midge these sections produce practically no sorghum grain.

DISTRIBUTION

The sorghum midge is now well established throughout the southeastern quarter of the United States (fig. 1). The greatest injury

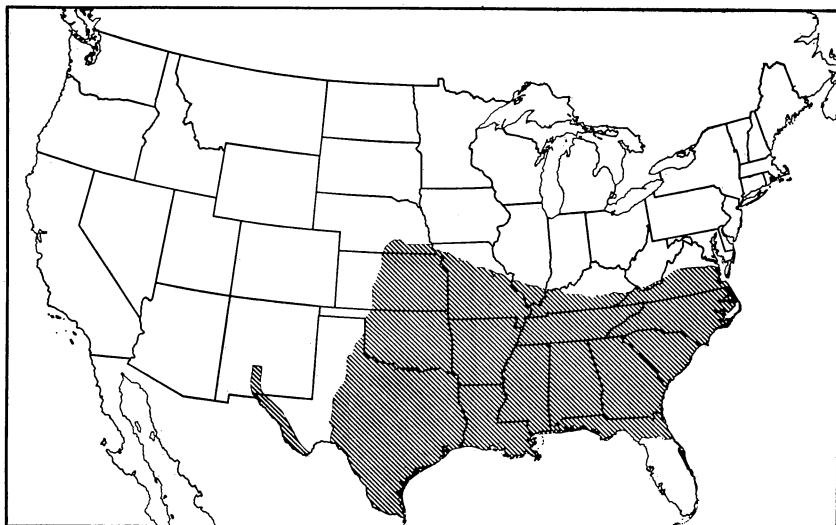


Figure 1.—The shaded area of the map shows the known distribution of the sorghum midge in the United States

from this pest is found within the more humid parts of its range in the Gulf States.

NATURE OF INFESTATION

If you examine a head of sorghum or other host plant while it is in bloom, you may see many of the small, orange-colored midges crawling over the spikelets. These midges are laying their eggs in the spikelets

¹ *Contarinia sorghicola*.

or seed husks. Pinch the spikelets a few days later and you will crush the small maggots that have hatched from the eggs. In a week or two after the plants have bloomed you will find the seeds dark and shriveled and containing the small orange-colored larvae or pupae of the midge.

The injury to sorghum grain by the sorghum midge is done by the larvae, or maggots, which feed on the juices of the developing seed, causing them to dry up and become discolored (fig. 2). The infested

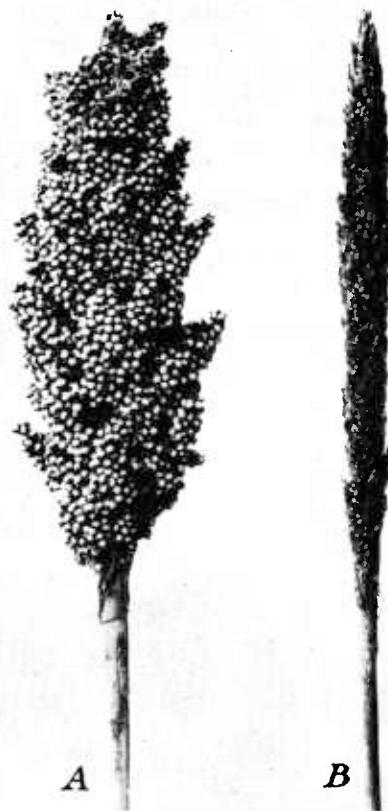


Figure 2.—Sorghum heads: A, Normal; B, severely injured by the sorghum midge.

grain heads appear blighted or blasted; they resemble sterile heads and produce practically no grain. An infestation of one larva per spikelet is sufficient to cause the loss of the grain. Blighted heads, however, may be due to lack of fertilization or some other cause.

No variety of sorghum has yet shown any great resistance to the attacks of the sorghum midge. The insect readily infests all varieties of the grain sorghums, sorgos (sweet sorghums), broomcorn, Johnsongrass, and Sudangrass. Purpletop, a wild grass plentiful in many of the Southern and Eastern States, is sometimes infested. Apparently the midge does not breed extensively in any other native wild grasses.

Serious injury to a field of sorghum does not occur unless there is a nearby infestation from which an influx of female midges may come. Johnsongrass, when allowed to head, provides an excellent place for development of the midge. It blooms very early, thus permitting the individuals first emerging to breed and increase in numbers before the sorghum fields come into bloom. Midge continue to breed throughout the season in Johnsongrass, thereby making it a constant source of infestation to blooming sorghum fields.

Fields of early sorghum from which midges are emerging are serious sources of infestation to adjacent fields that come into bloom later.

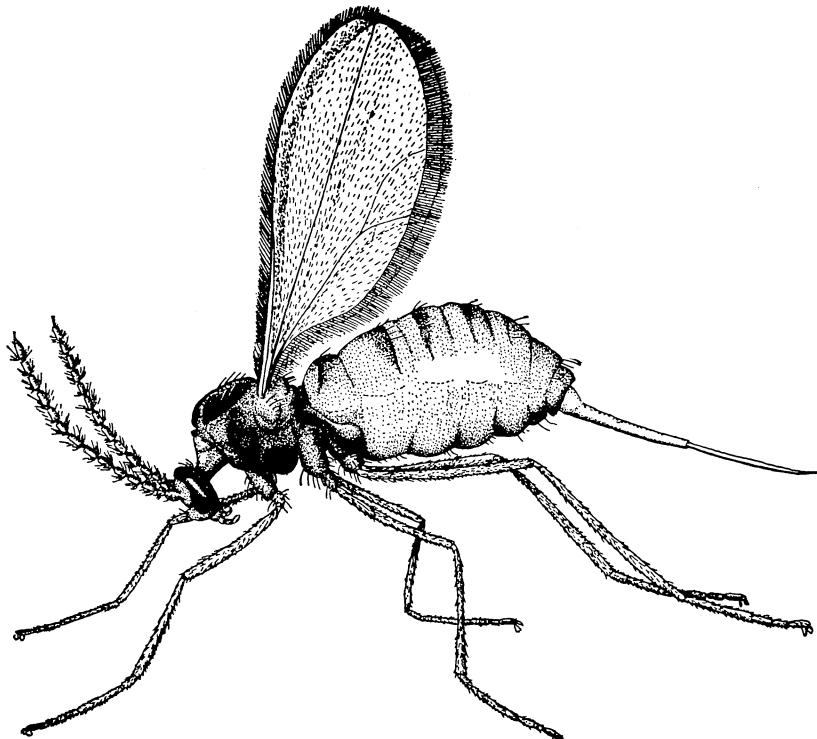


Figure 3.—Adult female sorghum midge, with ovipositor extended. Greatly enlarged.

Volunteer and early-blooming host plants may develop in a field some time before the main crop comes into bloom. These early heads are usually heavily infested and may provide an infestation for the remainder of the field.

Midges may fly a considerable distance from an infested field to fields of other host plants which are in bloom, especially with the help of the wind, which is an important factor in their dispersion. Practically all spread is in the direction of the prevailing winds.

LIFE OF THE MIDGE

The adult sorghum midge (fig. 3) is a minute orange-colored fly. The female is more robust than the male and has much shorter

antennae. Mating occurs soon after emergence. The females fly to the nearest suitable sorghum heads, and each lays from 30 to 100 tiny white eggs in the spikelets or seed husks. The females seldom live more than a day in the summer; the males live only a few hours. In about 2 days the eggs hatch into small maggots (fig. 4), which gradually darken from pink to orange as they feed on the developing grain. In 9 to 11 days they are full-grown. The maggots then change into dark orange pupae (fig. 5), from which a new generation of adults emerges in about 3 days. As many as 8 or 10 larvae

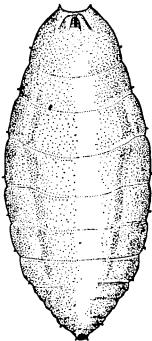


Figure 4 (left).—Larva of the sorghum midge. Greatly enlarged.

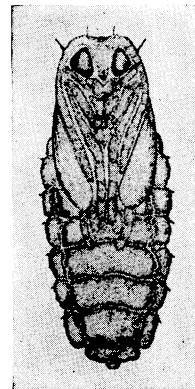


Figure 5 (right).—Pupa of the sorghum midge. Greatly enlarged.

may mature in a single seed. Under normal summer temperatures from 14 to 16 days are required for the complete life cycle. This time is longer in the earlier and later parts of the season and during cool spells in summer.

The adults appear early in the spring at about the time that Johnsongrass begins to bloom, and lay their first eggs in the heads of this grass. Flies continue to emerge from hibernation well into the summer, the greatest emergence occurring at about the time the early crop of sorghum is blooming. Where there are only a few host-plant heads in a suitable condition for egg laying, the females concentrate on these heads, and cause an extremely heavy infestation in them. Throughout the season the female midges are very active, laying their eggs on the flowering heads of any available host plants.

Successive life cycles occur throughout the season from the first emergence of hibernating individuals in the spring until the host plants are killed by freezing temperatures in the fall. The generations overlap to such an extent that no well-defined broods are apparent, and all stages of the insect may be found in the field at the same time. One or two generations usually occur on volunteer or wild hosts early in the spring before the cultivated crops bloom. As many as 13 generations of the midge occur during the growing season near San Antonio, Tex.

The midges winter as larvae within light brown cocoons in the spikelets of their host plants. A few larvae form their cocoons in the summer, but more of them form cocoons in the fall. Large numbers of larvae do not form cocoons. These die during the cold winter weather. Most of the larvae within their cocoons change to pupae and emerge as adults the following spring, but some do not transform and emerge until the second or third spring.

NATURAL ENEMIES

Birds, spiders, and insects help to keep the sorghum midge in check. In localities where the midge is plentiful large numbers of spiders are found on the sorghum heads, and more than 20 species have been observed feeding on adult midges.

Ants, including the Argentine ant and the small fire ants, destroy many midges by swarming over the sorghum heads and seizing the pupae as they work themselves out of the spikelets. They also attack the newly emerged adults before they are able to fly.

Three tiny, wasplike parasites feed on the larvae and pupae of the sorghum midge. One of them, *Eupelmus popa*, was apparently brought to the United States from India by accident about 1909 and is now found wherever the midge is abundant. Its life cycle is closely timed with that of the sorghum midge except that it emerges from hibernation a few days later in the spring. All of the parasites increase in number rather slowly early in the spring. It is not until late in the summer that they are abundant enough to check materially the damage being done by the midge.

CONTROL

Since the midge spends most of its life within the spikelets or seed husks, it is difficult to control the insect with an insecticide. Consult your county agent or State agricultural experiment station for control recommendations for your locality.

You can reduce losses from the sorghum midge by following these practices:

1. Plant only pure seed of a uniformly blooming strain. If you plan to make two plantings that will bloom at different times and these plantings are to be near together, use pure seed for each and plant so that the prevailing winds will blow toward the early-blooming field.
2. Prepare a good seedbed and cultivate the field to produce as nearly uniform a crop as possible.
3. Space plants so that they will produce the smallest number of tillers that will give a satisfactory yield.
4. Plant at the time of the year best suited for the variety selected.
5. Prevent Johnsongrass from producing heads in or near the sorghum field before the crop blooms. If you produce Johnsongrass or sorghum hay near a field of grain sorghum, cut and remove it several days before the grain crop comes into bloom. If you cannot make the cutting before the sorghum crop begins to bloom, delay it until blooming is completed. If you cut such hay while the sorghum is blooming, the adult midges emerging from the cut grasses will go to the sorghum to lay their eggs.
6. Destroy heads of sorghum that bloom much before the main crop. If such heads are cut within 5 days after the first blooms appear, they can be left on the ground where the midges will die. If cut later, especially in the fall, remove them from the field before the midges can emerge from them.

7. Locate the sorghum field as far as possible from all outside sources of infestation, such as earlier sorghum, Johnsongrass, Sudangrass, or broomcorn.

8. Where sorghum grain is threshed, plow under or destroy all refuse before the midges emerge in the spring.

9. Cultivate or burn fields of Johnsongrass early in the spring to destroy hibernating midges before they can emerge.

To obtain a satisfactory crop for seed purposes in a very heavily infested area, tie paper bags over the heads of selected plants during the blooming season to protect them from infestation by the midge



Figure 6.—Bags covering sorghum heads to protect them from insect damage.

(fig. 6). Place the bags on the heads as soon as the midges emerge, but remove the bags shortly after the blooming period.